

# PATENT SPECIFICATION

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## COMPLETE SPECIFICATION

### Improvements in or Relating to Film Feeding Apparatus

We, KODAK LIMITED, a Company organised under the Laws of Great Britain, of Kodak House, Kingsway, London, W.C.2 (Assignees of WILLIAM HOWARD HORTON and 5 PAUL JUSTEN ERNISSE, both Citizens of the United States of America, and both of 333, State Street, Rochester, New York, United States of America), do hereby declare the invention, for which we pray that a patent may 10 be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to film feeding apparatus of the type including a chamber 15 for receiving a spool of film and a rotatable shaft in the chamber for engaging and turning a spool inserted therein for the purpose of feeding the film through the apparatus.

A film feeding apparatus of the above type 20 to which the present invention is particularly applicable comprises a photographic camera in which upon rotation of the shaft in the requisite direction the film is unwound from the spool and is passed through a guide- 25 way into a take-up chamber where the film forms into loose convolutions.

With this type of camera it is necessary in such unwinding movement to prevent the film from becoming completely detached 30 from the spool core. After this unwinding or so-called extruding movement of the film, the shaft is usually rotated in the reverse direction in order intermittently to rewind the film on to the spool and to present the exposure 35 areas successively to the exposure frame of the camera for the purpose of making exposures.

A principal object of the present invention is to provide an improved form of device 40 which facilitates the unwinding of the film, particularly from a spool in which the film is confined between flanged or beaded spool ends, and which also operates to interrupt the unwinding movement of the film after the 45 required length has been fed into the take-up

chamber.

With the above object in view a film feeding apparatus of the type above set forth includes according to the invention a film engaging member extending into the spool 50 chamber and normally spring-urged into a position for engagement by the film near the periphery of the spool and serving to guide the film into a guideway, and a latching element in the form of a pawl operably connected 55 to the film engaging member for movement therewith, said pawl being moved into locking engagement with a ratchet wheel on the spool shaft when, after a predetermined unwinding movement of the film, the film 60 engaging member has been moved by the film radially inwards towards the core of the film spool.

In order that the present invention may be more fully understood, reference will now 65 be made to the accompanying drawings which illustrate one form of combined film engaging member and latching element as applied to a photographic camera of the so-called extrusion type. 70

Fig. 1 is a side elevation, largely in section, of the camera and illustrates the film engaging member in its operative position.

Fig. 2 is an enlarged view corresponding to the right-hand end of Fig. 1. 75

Fig. 3 is a sectional view taken on the line III—III of Fig. 2.

Fig. 4 is a side elevation of part of the camera illustrating the latching element in relation to the ratchet wheel on the film 80 winding shaft.

Fig. 5 is a view similar to Fig. 2 but illustrates the position of the film engaging member at the end of the film unwinding movement. 85

Fig. 6 is a view substantially similar to Fig. 3.

Fig. 7 is a view similar to Fig. 4 but shows the latching element in locking engagement with the ratchet wheel. 90

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Fig. 8 is a detail view illustrating the position of the film engaging member in relation to the free edge of the film before the commencement of a film unwinding movement.

5 The camera illustrated comprises a camera body 1, (Fig. 1), provided with a lens and shutter unit 2 employed for making exposures on a film F positioned over an exposure aperture 3. One end of the camera is provided with a film spool receiving chamber 4 of cylindrical shape. This chamber, as illustrated in Fig. 6, is closed at one end by a cover 5 hinged to the camera body 1 at 6 and having a latch in the form of a spring lug 7 which in the closed position of the cover engages a pin 8. When the cover is swung open, a film spool C may be inserted endwise into the spool chamber 4 for engagement with a film winding shaft 9.

20 The winding shaft 9 extends axially into the spool chamber 4 and has a knob 10 disposed outside the wall 17 of the camera. The shaft includes a cylindrical collar 11 and portions 12, 13 which are respectively of square and round cross-section. The inner end 14 of the shaft 9 is tapered as shown in Fig. 6. The film spool C has a flange 15 which bears against the collar 11 and has a square aperture for engagement with the square section 12 of the shaft 9. Upon rotation of the knob 10 the spool is turned by the shaft. A ratchet wheel 16 is keyed to the shaft 9 and is located adjacent the inner surface of camera wall 17 (see Fig. 6).

35 When the film spool C has been inserted in the spool chamber 4, the film may be extruded or unwound by rotating knob 10 in the requisite direction. As illustrated in Fig. 8, the film spool includes in addition to the flange 15 an opposite end flange 18, these flanges having inwardly formed beads 33 which confine the edges of the film and normally hold the film in a wound condition. The free end of the film 19 through being bevelled tends to bulge outwardly as indicated in Fig. 8.

At the commencement of a film unwinding movement, the bulging end 19 of the film is brought into engagement with finger 30 of a film-engaging member 20, this being readily achieved since a certain amount of play is provided between the square section 12 of the shaft 9 and the square aperture in the spool flange 15. The film engaging member 20 is in the form of a plate-like arm extending from a base or bridge-piece 21 formed integrally with another arm 22 constituting a latch element or pawl for co-operation with the ratchet wheel 16. It will be seen particularly from Figs. 3 and 6 that the film engaging member 20, bridge 21 and pawl 22 constitute a U-shaped unit pivotally mounted on a shaft 25 disposed parallel to the axis of the shaft 9 and passing through apertures 23 and 24 in the pawl 22 and film-engaging

member 20 respectively. A light spring 25' (see particularly Figures 2 and 3) is coiled around the shaft 25, one end of the spring engaging beneath the bridge member 21 and the other end of the spring bearing against 70 a wall portion 26 of the camera. This spring tends to turn the film-engaging member in the clockwise direction, (arrow B, Fig. 2) so that its pointed end or finger 30 tends to move radially outwards with respect to the axis 75 of the film spool. Since the pawl 22 is connected to the film engaging member 20, the pawl normally tends to occupy a position at which it is disengaged from the ratchet wheel 16 as indicated at Fig. 4. This clockwise movement of the film-engaging member 20 is limited by a stop in the form of an adjustable screw 28 which enables the normal or rest position of the film-engaging member 20 and pawl 22 to be regulated. 85

When the film spool C is inserted in the spool chamber the finger 30 of the film-engaging member 20 is positioned between the bulged end 19 and the first convolution of the film F. The shaft 9 is then turned in 90 the direction of the arrow A, Fig. 2, with the result that the finger 30 increases the curvature of the bulged film end 19 and releases it from the spool flange beads 33. Continued movement of the shaft 9 results in the film 95 being directed through a guideway defined by walls 35, 36 (Fig. 1) which converge from the spool chamber 4 towards a narrow guideway 39 formed by camera walls 37, 38. The film passes along guideway 39 across the exposure aperture 3 into a film-receiving or take-up chamber 40 in which the film forms into loose convolutions with the assistance of one or more strip springs 41, 42.

During the unwinding movement above 105 described, the part of the film leaving the spool C acts on the film-engaging member 20 so as to move the finger 30 radially inwards with respect to the spool. At the end of the film unwinding movement, the finger 30 110 occupies the position illustrated in Fig. 15 where it is shown adjacent the film core 50 and the adhesive strips 51 by which the film F is attached to the core. It will of course be realised that the pawl 22 participates in 115 the movement of the film-engaging member 20 and when the latter reaches the Fig. 5 position the pawl 22 is moved into locking engagement with the ratchet wheel 16, as indicated in Fig. 7, thereby interrupting the unwinding movement of the film. The film F is now ready to be rewound on to the film spool C upon reverse rotation of the winding knob 10. In this rewinding movement which takes place intermittently, successive exposure areas of the film are presented to the exposure aperture 3 for the making of exposures.

It will be appreciated from the foregoing description that the film-engaging member 130

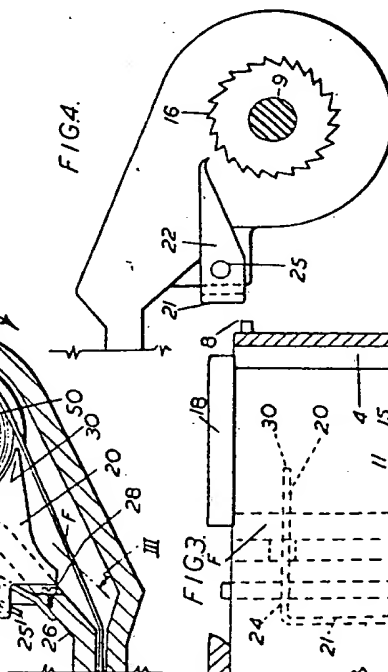
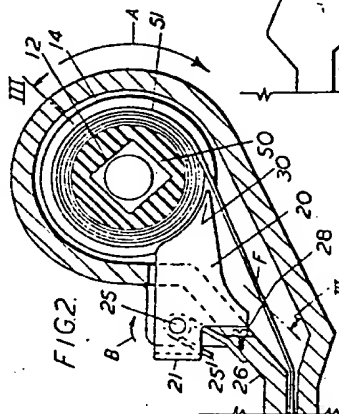
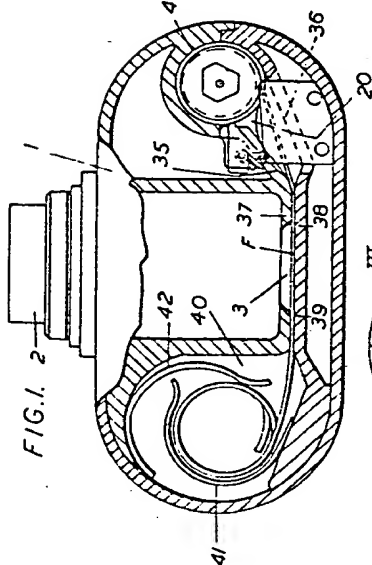


FIG. 4.

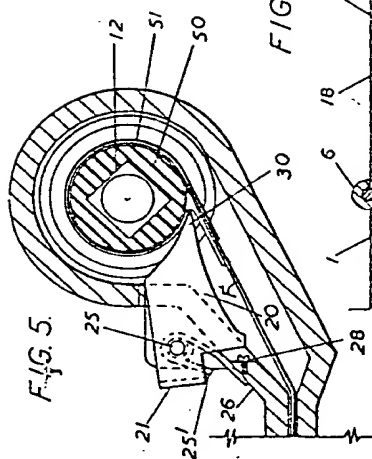
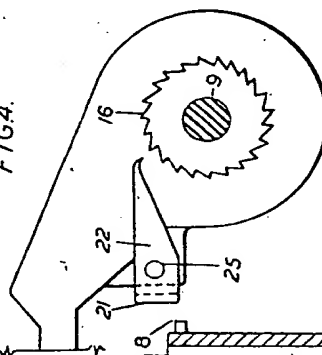


FIG. 5.

FIG. 6.

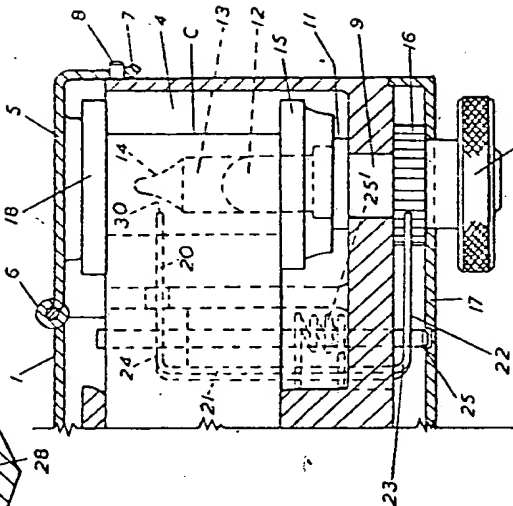


FIG. 7.

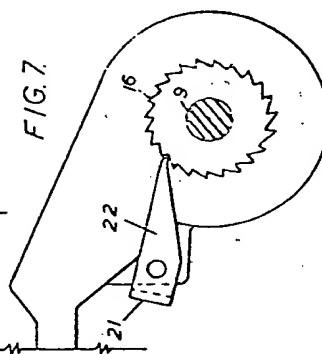
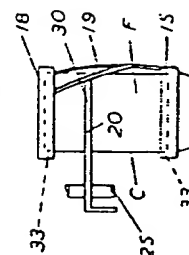


FIG. 8.



20 facilitates the initial release of the free end of the film from the fully wound film spool and that the film itself during unwinding pivots the film-engaging member against  
5 the action of spring 25 so as to move the pawl 20 towards the ratchet wheel 16, the construction being such that these latter parts are engaged at the completion of the film unwinding movement.

10 It will be apparent to those skilled in the art that the means above described for controlling the unwinding movement of a film may be applied to a "still" picture projector in which film bearing images for projection  
15 is initially unwound from a film spool in a compartment at one side of a projection aperture across which it is passed into a take-up compartment, the projection of the images taking place in between the film rewinding  
20 operations.

What we claim is: —

1. Film feeding apparatus including a chamber for receiving a spool of film and a rotatable shaft in the chamber for engaging  
25 and turning a spool inserted therein, wherein a device for facilitating an unwinding movement of the film and for interrupting said movement after a predetermined interval comprises a film-engaging member extending  
30 into the spool chamber and normally spring-urged into a position for engagement by the film near the periphery of the spool and serving to guide the film into a guideway, and a  
35 latching element in the form of a pawl operably connected to the film engaging member for movement therewith, said pawl being

moved into locking engagement with a ratchet wheel on the spool shaft when, after a predetermined unwinding movement of the film, the film engaging member has been 40 moved by the film radially inwards towards the core of the film spool.

2. Film feeding apparatus according to Claim 1, wherein the film-engaging member and latching element comprise a unit pivoted 45 tally mounted on a shaft extending parallel to the axis of the winding shaft, said unit being acted on by spring means tending to move the unit to a position at which the pawl is disengaged from the ratchet wheel. 50

3. Film feeding apparatus according to Claim 1 or 2, wherein the film-engaging member comprises an arm having a finger which is engageable behind the free end of the film on a fully wound film spool having end 55 flanges so that upon rotation of the winding shaft the finger releases the film end from the flanges.

4. Film feeding apparatus according to any of the preceding claims, wherein a film 60 guideway extends from the spool chamber to a guideway through which the film passes across a film exposure or projection aperture.

5. Film feeding apparatus constructed and adapted to operate substantially as herein 65 described with reference to the accompanying drawings.

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